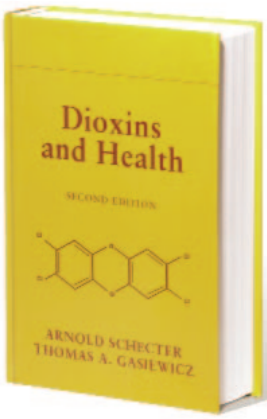
Dioxins and Health, 2nd edition

Edited by Arnold Schechter and Thomas A. Gasiewicz



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Dioxins were first discovered more than 30 years ago as unwanted contaminants arising during the synthesis of some organochlorine compounds and during various kinds of incineration. Their presence as trace but highly toxic contaminants in Agent Orange continues to haunt our legacy in Vietnam. Dioxins are highly persistent chemicals in the environment and in people's bodies, and they have stimulated intense policy and political debates over the last three decades. Since the first edition of *Dioxins and Health* was published in 1994, much has happened in the dioxin arena, and this new edition excellently captures these new findings and the nuances of current controversies.

Dioxins and Health's 22 chapters are written by well-respected authorities. Knowledgeable and distinguished, the authors generally represent the view that dioxins pose a serious human health threat. Dioxin researchers who have tended to downplay dioxin's risks are not well represented; nevertheless, the book is complete and well referenced, and it should be a valuable source of information on an important and complex issue in environmental health. It is written in a scientific style, but some chapters should be more understandable to the nonscientist than others.

Dioxins and Health addresses all the key issues in dioxin research. The chapters on sources and human exposure emphasize that "dioxins" encompasses 210 different polychlorinated dibenzodioxins and dibenzofurans emitted in varying amounts from numerous sources. The congeners differ dramatically in their toxicity and biologic persistence; some persist in the human body and in the environment for decades. Human exposure comes primarily from ingesting food contaminated with dioxins; these are sequestered in milk, raising concerns for breast-feeding. Virtually every person in the world has some level of dioxins in the body.

Several chapters focus on health effects of dioxins, and most argue that dioxins are extraordinarily potent endocrine disruptors, as evidenced by their ability to modify an incredible array of hormone-receptor and endocrine-signaling pathways. This book details a growing body of data indicating that noncancer health effects—developmental, reproductive, neurologic, and immunologic toxicities—might pose a greater health concern than cancer from dioxin exposure. The authors agree that most, if not all, dioxin effects require binding to the aryl hydrocarbon (Ah) receptor. Binding to the Ah receptor is an early and fairly well-understood event, but subsequent steps leading to toxicity are not well characterized. One chapter provides considerable information to show that the Ah receptor is highly conserved during evolution. Although dioxins are toxic to wildlife, little attention is devoted to ecologic health effects except a chapter that discusses Ah receptor-mediated effects in fish.

The most contentious debate over dioxin's health effects has centered on dose–response relationships. Several chapters address this issue and one is devoted to it. The overarching question is "do dioxin's effects exhibit linear dose response relationships or is there an apparent threshold below which no effects are expected to occur?" The answer appears to be yes and yes, based on a rigorous analysis of more than 100 different responses to dioxin. This conclusion certainly complicates the job of the risk assessor and risk manager. This point is made clearly in the introduction, but more important for readers is a chapter on risk characterization, by Bill Farland and Linda Birnbaum of the U.S. Environmental Protection Agency, which presumably reflects the long awaited and yet-to-be-released reevaluation of dioxin's risks. This reevaluation began in 1991, continued through both Clinton administrations, and is now well into the administration of George W. Bush. More than 100 scientists have participated in this effort, and there have been numerous panel and public reviews. Publication of a risk characterization in *Dioxins and Health* by the lead individuals in the reevaluation certainly adds considerable value to the readers of this book.

Scientists, students, and government officials seeking to know more about the science of a class of chemicals with an astounding impact on environmental health policy should find *Dioxins and Health* a valuable reference.

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